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AUTHOR Saunders, Nancy; Batson, Ted; Saunders, George
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ABSTRACT

A study focused on the relationship between instructional strategies and students' reported meta-skill attainment in an adult education context. Using the data collected from 2,507 end-of-course surveys of students in the Graduate Studies in Education program at Indiana Wesleyan University, analyses were run to test for correlations between the independent variables (19 instructional strategies) and each of 10 dependent variables (10 meta-skills). The three key findings of the study were the following: (1) instructional strategies clustered into four identifiable composites, each supported by a current and credible educational theory; (2) the curriculum composite of instructional strategies strongly correlated with reported attainment of all 10 meta-skills; and (3) the assessment composite of instructional strategies correlated with reported attainment of no meta-skills. The study concluded that curriculum and assessment are essential components of any educational program and require substantial resource investment and attention to design, and that direct meta-skill instruction should be a component of courses offered in formal adult education programs. (Contains 68 references.) (Author/KC)

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The Impact of Instructional Strategies on the Development of Meta-Skills in the Adult Learner

by
Dr. Nancy Saunders
Dr. Ted Batson
Dr. George Saunders

Adult and Professional Studies Division
Indiana Wesleyan University
Marion, Indiana

N. Saunders

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Abstract

This study focused on the relationship between instructional strategies and students' reported meta-skill attainment in an adult education context. Using the data collected from 2,567 end-of-course surveys of students in the Graduate Studies in Education program at Indiana Wesleyan University, analyses were run testing for correlations between the independent variables (19 instructional strategies) and each of ten dependent variables (10 meta-skills).

The three key findings of this study were the following:

- Instructional strategies clustered into four identifiable composites, each of which was supported by a current and credible educational theory;
- The curriculum composite of instructional strategies strongly correlated with reported attainment of all ten meta-skills;
- The assessment composite of instructional strategies correlated with reported attainment of no meta-skills.

Implications were drawn from this study were the following:

- Curriculum and assessment are essential components of any educational program and require substantial resource investment and attention to design.
- Direct meta-skill instruction should be a component of courses offered in formal adult education programs.

Introduction

The 21st century is upon us. The Age of Information dominates our national culture and thought. In response to rapid economic and cultural change, adults are entering institutions of higher learning in increasing numbers. This shift in educational demographics has forced a shift in educational programming. Colleges and universities struggle to develop educational opportunities for this non-traditional student population.

With a commitment to serving non-traditional students comes the need to understand the key characteristics of this adult learner population. The adult learner brings to the classroom a wealth of experience. The educator of adults must draw out and build upon this experience (Houle, 1996). The adult learner has a strong desire for relevancy. The educator must show how new knowledge and skills relate to everyday situations (Stein, 1998). The adult learner requires an accessible, convenient educational opportunity. Semi-independent educational structures for adult learning must be designed to meet this need (Knowles, 1980). The adult learner faces rapid and unsettling change in the workplace, and needs the skills critical for success in the unpredictable work environment of the 21st century (DeJoy, 1997).

The Adult and Professional Studies (APS) Division of Indiana Wesleyan University is an educational model designed to meet the personal and professional needs of the adult learner. As a result, its curriculum is constructed to be current, relevant, and applicable to students' personal and professional lives. APS offers its constituency nine undergraduate and graduate degree programs in business, nursing, and education. Evening, Saturday and online courses are offered at more than 60 off-campus locations. Program and course materials are shipped to students and the university library operates an extensive off-campus support service.

This program is committed to meeting the educational needs of working professional adults. These educational needs include the development of workplace skills that result in resilience, adaptability, and self-reliance. These competencies, critical for success in today's work environment, APS has called meta-skills - cognitive and affective strategies that can be successfully applied to novel situations. The focus of the current

study is on the impact of instructional strategies on the development of these meta-skills in the adult learner.

Study Context and Purpose

The context of this study was the Graduate Studies in Education Department of the Adult and Professional Studies Division of Indiana Wesleyan University. This graduate education program offered day-long Saturday classes for cohorts of practicing teachers at off-campus sites around the state. Students progressed through an integrated eighteen-month program and were supported by an extensive system of off-campus services.

This program was committed to meeting the educational needs of working professionals. Responding to workplace demands for self-reliant thinkers, able to adapt to and thrive in changing circumstances, a focus of this graduate program was on meta-skill development. Referred to as the "Ten Across the Curriculum" skills (see Appendix B), these meta-skills were cognitive and affective processes that transcended knowledge acquisition (American Heritage Dictionary, 1990). They were strategies that an individual could successfully apply to the processing of new information in an unfamiliar situation (Clark, 1999). Examples of the program's target meta-skills were the ability to read complex materials with comprehension, the ability to communicate effectively, the development of information literacy, and the ability to consistently exhibit ethical thought and action, among others.

Within this context, the primary purpose of this study was to determine whether the instructional strategies imbedded in the program's design were related to the development of adult learners' meta-skills. For example, were class activities in the course modules related to the attainment of students' meta-skills? Were assessment procedures related to meta-skill development? Was meta-skill growth related to high expectations, instructors' worldview, or effective use of textbooks?

Theoretical Framework

The theoretical framework of this study was the social learning theories of Johnson and Johnson (1994) and Rotter (1954). The Social Interdependence Theory of Johnson and Johnson assumed the way social interdependence was structured determined how individuals interact, which, in turn, determined behaviors. Positive interdependence resulted in cooperative interaction through which individuals encouraged and facilitated each other's efforts. Negative interdependence resulted in competitive interaction, as individuals discouraged and obstructed each other's efforts to achieve.

In this study context, social interdependence was structured through the non-traditional format of the graduate education program. Course activities and assignments were designed to develop positive social interdependence and encourage collaborative interaction. Instructional strategies within this format were dependent upon students' willingness to engage in the learning context, and instructor's ability to facilitate positive social interdependence. Students were expected to consolidate personal experience and expertise with the shared understandings of the cohort and to gain content knowledge and meta-skills through the interaction.

The Social Learning Theory of Julian Rotter arose from the traditions of both learning theory and personality theory. Rotter established the assumption that meaningful learning occurred in a social environment, through social interactions with other people. "It is a social learning theory because it stresses the fact that the major or basic modes of behaving are learned in social situations and are inextricably fused with needs requiring for their satisfaction the mediation of other persons" (Rotter, 1954, p. 84).

A theoretical assumption of this study was that positive social interdependence and collective affective and cognitive interactions stimulate meaningful learning. The program's structure of study groups and cohort learning communities supported learners' acquisition of knowledge and provided a framework that fostered learner meta-skill development.

Another theoretical assumption of this study stemmed from the humanistic orientation of Carl Rogers, who, in his theory of learning, stated that the learner was best situated to evaluate his or her learning experience and was able to assess cognitive and affective growth (1983). Self-reports by students on end of course surveys constituted

the data collected in the current study. These self-reports described students' learning experiences and their perceptions of meta-skill growth. Based on Rogers' learning theory, it was assumed that participants in this study were self-aware individuals, able and willing to evaluate accurately and honestly their learning experiences.

Review of Literature

Instructional effectiveness is a critical concern for stakeholders across the spectrum of educational contexts and constituencies. From preschool classes to GED courses, in charter schools and colleges, educators strive to design optimal learning opportunities. The research literature reflects the concern and desire of educators to implement instructional strategies that maximize student learning.

For the purposes of this study, the literature base on instructional effectiveness has been narrowed to the field of higher education. It has been further narrowed by focusing only on those studies that have concentrated on the impact of instructional strategies on student learning. The two areas of research reviewed are the following:

- studies conducted to clarify the relationship of instructional strategies on knowledge acquisition, and
- studies conducted to identify instructional strategies related to meta-skill development.

Studies conducted to clarify the relationship of instructional strategies to knowledge acquisition are plentiful, and provide a useful foundation for research on meta-skill development. Several excellent literature reviews of educational research have been published. The most comprehensive review is Pascarella and Terenzini's *How College Affects Students* (1992). Drawing upon hundreds of sources, this review describes findings relating to such topics as teacher behavior, students' cognitive growth, and instructional approaches. Less comprehensive, but more focused, is the literature review by Lowman (1994). A review based on studies using end-of-course survey data, Lowman's analysis describes what constitutes masterful teaching for content in the higher education environment. Focusing on a broader base, Forsyth and McMillan (1994)

reviewed research literature that informed educators on instructional practices effective in motivating students in higher education.

Studies have also been conducted in adult education contexts. Darling-Hammond and McLaughlin (1995), Miller and Silvernail (1994), Kerchner (1993), Andrew and Schwab (1995) and Shin (1994), to name a few, have described several strategies as especially effective for the adult learners' knowledge acquisition. These studies in adult education have been set within professional development settings, as well as formal and informal education settings.

Two meta-analyses have been conducted of studies focusing on the relationship between instructional strategies and student achievement. Cohen (1987) and Feldman (1994) have analyzed over 40 studies based on student ratings of specific instructor strategies. Studies were chosen by Cohen (1987) and Feldman (1994) that used end-of-course survey data, as well as end-of-course exam scores to determine both the students' perceptions of instructional effectiveness as well as their knowledge acquisition. Cohen (1987) and Feldman (1994) found, through their respective meta-analyses, the instructional strategies most strongly related to knowledge acquisition were the following:

1. preparation and organization of professor,
2. clarity and understandableness of professor,
3. sensitivity to, and concern with, class level and progress, and
4. stimulation of student interest.

This meta-analysis is especially informative for instructors in higher education who are seeking to improve student learning in their classrooms.

Studies conducted to identify instructional strategies related to meta-skill development relate directly, rather than foundationally, to this study which is "centrally concerned with the development of a critically aware frame of mind, not with the assimilation of previously defined skills or bodies of knowledge" (Brookfield, 1995, p 201). This critically aware frame of mind includes an understanding of meta-skills such as metacognition, the development of critical thinking and problem solving skills, and progress toward self-regulation and direction.

Educators have begun to recognize the importance of teaching metacognitive strategies in higher education to improve the use of meta-skills and the transfer of learning to novel situations (Bruning, Schraw, and Ronning, 1995). Metacognitive awareness implies that individuals can describe their own understanding and use the information they have (Hammann and Stevens, 1998).

In a study by Mandl, Gruber and Renkl (1993), strategies, such as peer collaboration and meta-skill application, were developed to make metacognitive teaching more effective. These strategies were based on two models of learning: *cognitive apprenticeship* (Collin, Brown, and Newman, 1989) and *anchored instruction* (Bransford, Sherwood, Hasselbring, Kinzer & Williams, 1990).

Studies by Williams (1992), Glaser (1991) and Schmidt (1993) emphasized attention to context when teaching metacognitive strategies. Other studies (Darling-Hammond, 1999, OTA, 1995, Qin, Johnson and Johnson, 1995, Slavin, 1996) discussed the potential for metacognitive growth in collaborative settings. Meta-skill training and practice were highlighted in both Svinicki's (1994, 1996) and Mevarech's (1999) conclusions. Strategies such as scaffolding and advanced organizers have also been found effective (Schraw and Graham, 1997).

The development of meta-skills such as critical thinking and self-regulation has been studied extensively in the past few years. Training for critical thinking is a challenge, as there are few models to guide educators. Strategies such as collaborative peer and instructor support (Keeley, Sheinberg, Cowell, and Zinnbauer, 1995), active learning activities (Kirby and Goodpastor, 1995), use of credible experts (Haas and Keeley, 1998), in-class dialogue (Jones and Ratcliff, 1993) and the use of creative evaluation instruments (Ramsden, 1992) have been studied and found effective in meeting this challenge.

Self-regulation in learning is a complex activity, requiring an integration of several meta-skills (Pintrich and DeGroot, 1990). For individuals to be self-regulating, they must combine metacognitive processes, motivational orientation, learning strategies, and complex performances (Hammann and Stevens, 1998). Strategies that encourage self-regulation include providing accountability (Arredondo and Rucinski, 1994), allowing for choice and control over learning activities (Borkowski, Carr, Rellinger and

Pressley, 1990; Pintrich, Smith, Garcia, and McKeachie, 1991) and developing collaborative work groups (Van Zile-Tamsen, 1997).

Research literature on instructional effectiveness in higher education is abundant. Studies clarifying relationships between instructional strategies and knowledge acquisition for college-age and adult students provide a foundation for the current study. This foundation consists of literature reviews, meta-analyses and individual studies that focus on the relationship between instructional strategies and cognitive growth. Directly informing this study are several research projects that focus on the relationships between instructional strategies and meta-skill development. These studies explore the meta-skills of metacognition, critical thinking and self-regulation, and propose models and strategies for their development.

Study Methodology

Over a 12-month period, from June 1998 through May 1999, 2,567 end-of-course survey responses were collected from students in the Graduate Studies in Education program at Indiana Wesleyan University. Students completed these surveys (see Appendix A for survey sample) during the final class of each of eight graduate education courses.

This end-of-course survey was divided into two sections. Nineteen questions focused on instructional strategies. Students were asked to rate the effectiveness of instructional strategies on a five-point Likert scale from "not at all effective (1)" to "completely effective (5)."

Ten questions focused on meta-skill growth. Students were asked to rate the effectiveness of the completed course in helping them develop specific meta-skills. Again, the ratings were on a five-point Likert scale ranging from "not at all effective (1)" to "completely effective (5)." The surveys were anonymous, and were seen by instructors only after the APS Research Department had compiled the responses.

Using the statistical program SPSS, several statistical analyses were conducted using the data collected from the 2,567 end-of-course surveys. These analyses tested for

correlations between the independent variables (instructional strategies) and each of ten dependent variables (meta-skills).

First, a *Pearson correlation coefficient* was run of the whole sample. Next, a *multiple regression analysis* was conducted of the whole sample. This analysis highlighted correlations between specific instructional strategies and specific meta-skills.

A *factor analysis* was then conducted on the sample, using a varimax rotation. This analysis found four key clusters or composites of instructional strategies. These clusters became "Composite Instructional Strategies #1 through #4."

A *multiple regression analysis* was conducted of the whole sample, testing the correlation between the four Composite Instructional Strategies (the independent variables) and each of the ten meta-skills (the dependent variables). This *multiple regression analysis* was conducted again, while controlling for course. Finally, this *multiple regression analysis* was conducted while controlling for a selection of instructors.

Interview evidence was also collected to provide a different perspective on the relationship between the program's instructional strategies and students' perceived meta-skill growth. Focus group interviews were held with five randomly selected cohort communities, and included 85 respondents.

Findings

N: 2,567 responses

1. MULTIPLE REGRESSION ANALYSIS OF THE WHOLE SAMPLE

A Correlation of the 19 instructional strategies with the 10 meta-skills

META-SKILL	***Instructor Strategy***	beta
1. World view	13. Faith evident	.35
2. Ethics	13. Faith evident	.21
3. Lifelong learning		
4. Reading	19. Textbook	.30
5. Critical thinking		
6. Problem solving		
7. Writing	16. Homework	.20
8. Oral		
9. Finding information	16. Homework	.20
10. Teamwork	17. Discussion	.20

Beta coefficient with a significance of .01 or better. * indicates .05 or better

2. FACTOR ANALYSIS

A factor analysis with a varimax rotation was completed on the whole sample. Four key components or clusters of instructional strategies emerged. The "Composite Instructional Strategies" were the following:

Composite Instructional Strategy #1: questions 1 - 7 = Andragogy
Composite Instructional Strategy #2: questions 8 - 10, 18 = Assessment
Composite Instructional Strategy #3: questions 15 - 17, 19 = Curriculum
Composite Instructional Strategy #4: question 13 = Faith

End of Course Survey Question	*Composite Instructional Strategy*			
	#1: Andragogy	#2: Assessment	#3: Curriculum	#4: Faith
1	.68			
2	.61			
3	.70			
4	.72			
5	.72			
6	.50			
7	.57			
8		.64		
9		.84		
10		.84		
11				
12				
13				.69
14				
15			.69	
16			.76	
17			.68	
18		.66		
19			.71	

3. MULTIPLE REGRESSION ANALYSIS OF THE FOUR COMPOSITE INSTRUCTIONAL STRATEGIES WITH THE TEN META-SKILLS

META-SKILL	*Andragogy*	*Assessment*	*Curriculum*	*Faith*
1. World view			.27	.34
2. Ethics	.21		.33	.21
3. Lifelong	.27		.35	
4. Reading			.50	
5. Critical thinking	.24		.40	
6. Problem solving			.42	
7. Writing			.37	
8. Oral	.21		.36	
9. Information			.43	
10. Teamwork			.30	

Beta coefficient with a significance of .01 or better. * indicates .05 or better.

4. MULTIPLE REGRESSION ANALYSIS OF THE FOUR COMPOSITE INSTRUCTIONAL STRATEGIES WITH THE TEN META-SKILLS CONTROLLING FOR COURSE.

Composite Instructional Strategy # 1: **Andragogy**

METASKILL	**Edu545** Educ.Issues	**Edu550** Curriculum	**Edu551** Instr Theory	**Edu553** Assessment	**Edu554** Computers	**Edu555** Materials	**Edu556** Research	**Edu557** Leadership
1. World view						.32		
2. Ethics					.27		.26	.37
3. Lifelong		.32	.20		.32	.32	.33	.29
4. Reading								
5. Critical thinking			.25		.25		.24	
6. Problem solving					.28			.36
7. Writing	.28				.27			
8. Oral	.22	.24		.31	.26	.24		
9. Information								
10. Teamwork								

Beta coefficient with a significance of .01 or better. * indicates .05 or better.

Composite Instructional Strategy #2: **Assessment**

METASKILL	**Edu545** Educ Issues	**Edu550** Curriculum	**Edu551** Instr Theory	**Edu553** Assessment	**Edu554** Computers	**Edu555** Materials	**Edu556** Research	**Edu557** Leadership
1. World view								
2. Ethics			.21					
3. Lifelong								
4. Reading								
5. Critical thinking								
6. Problem solving								
7. Writing		.24	.26					
8. Oral			.30				.30	
9. Information			.21					
10. Teamwork					.22	.31	.29	

Beta coefficient with a significance of .01 or better. * indicates .05 or better.

Composite Instructional Strategy #3: **Curriculum**

METASKILL	**Edu545** Educ Issues	**Edu550** Curriculum	**Edu551** Instr Theory	**Edu553** Assessment	**Edu554** Computers	**Edu555** Materials	**Edu556** Research	**Edu557** Leadership
1. World view	.27		.46	.28	.25	.34		.24
2. Ethics	.45	.32	.35	.40	.25	.39	.20	.26
3. Lifelong	.4	.29	.43	.41	.28	.33		.31
4. Reading	.49	.44	.65	.47	.35	.37	.58	.51
5. Critical thinking	.37	.40	.46	.44	.31	.37	.43	.34
6. Problem solving	.37	.50	.50	.45	.29	.36	.58	.28
7. Writing	.37	.36	.43	.38	.26	.43	.48	.22
8. Oral	.40	.40	.41	.35	.26	.37	.38	.24
9. Information	.46	.46	.50	.40	.37	.30	.51	.20*
10. Teamwork	.31	.24	.33	.42	.31			

Beta coefficient with a significance of .01 or better. * indicates .05 or better.

Composite Instructional Strategy #4: **Faith**

METASKILL	**Edu545** Educ Issues	**Edu550** Curriculum	**Edu551** Instr Theory	**Edu553** Assessment	**Edu554** Computers	**Edu555** Materials	**Edu556** Research	**Edu557** Leadership
1. World view	.22	.30	.25	.45	.40		.32	.40
2. Ethics		.20		.23	.26		.20	
3. Lifelong							.20	
4. Reading								.23
5. Critical thinking								.20
6. Problem solving								
7. Writing								.30
8. Oral								.35
9. Information								
10. Teamwork								

Beta coefficient with a significance of .01 or better. * indicates .05 or better.

5. MULTIPLE REGRESSION ANALYSIS THE FOUR COMPOSITE INSTRUCTIONAL STRATEGIES WITH THE TEN META-SKILLS CONTROLLING FOR INSTRUCTOR.

The sample of instructors consists of all instructors with 60 or more end of course survey responses in the data bank. Eight were chosen out of 73 instructors.

Composite Instructional Strategy #1: **Andragogy**

METASKILL	Instructor 1	Instructor 2	Instructor 3	Instructor 4	Instructor 5	Instructor 6	Instructor 7	Instructor 8
1. World view				.46	.33			
2. Ethics								
3. Lifelong					.31		.33	
4. Reading								
5. Critical thinking			.41	.40				
6. Problem solving				.26*	.32	.38*		
7. Writing								
8. Oral							.36*	
9. Information			.34					
10. Teamwork			.37	.58	.24*	.40*		

Beta coefficient with a significance of .01 or better. * indicates .05 or better.

Composite Instructional Strategy #2: **Assessment**

METASKILL	Instructor 1	Instructor 2	Instructor 3	Instructor 4	Instructor 5	Instructor 6	Instructor 7	Instructor 8
1. World view								
2. Ethics								
3. Lifelong							-.48	
4. Reading	.28*						-.50	
5. Critical thinking	.38						-.58	
6. Problem solving	.54	.41*					-.40*	
7. Writing								50
8. Oral								
9. Information	.36			.23*	.33		-.48	
10. Teamwork	.39							.43*

Beta coefficient with a significance of .01 or better. * indicates .05 or better.

Composite Instructional Strategy #3: **Curriculum**

METASKILL	Instructor 1	Instructor 2	Instructor 3	Instructor 4	Instructor 5	Instructor 6	Instructor 7	Instructor 8
1. World view	.36	.48	.48	.41	.45		.60	.38*
2. Ethics	.53	.53	.57	.30*	.28*	.34*	.60	.50
3. Lifelong	.45	.49	.34	.35	.45	.38*	.70	.52
4. Reading	.38	.55	.47	.63	.55	.53	.88	.42
5. Critical thinking	.38	.60	.36	.48	.45	.50	.77	.50
6. Problem solving	.30	.37	.45	.54	.31	.50	.67	.52
7. Writing		.63	.34	.48	.49	.50	.53	.34
8. Oral	.33	.54	.46	.51	.35	.64	.44	.36
9. Information	.50	.58	.37	.60	.40	.51	.75	.42
10. Teamwork		.64	.30	.27	.31	.80	.43	

Beta coefficient with a significance of .01 or better. * indicates .05 or better

Composite Instructional Strategy #4: ***Faith***

METASKILL	Instructor 1	Instructor 2	Instructor 3	Instructor 4	Instructor 5	Instructor 6	Instructor 7	Instructor 8
1. World view			.38		-.24	.31*	.52	
2. Ethics			.20				.33*	
3. Lifelong		.29			-.25		.28	
4. Reading							.48	
5. Critical thinking		.37			-.23*		.46	
6. Problem solving							.54	
7. Writing					-.23*			
8. Oral		.33						
9. Information		.34					.24*	
10. Teamwork								

Beta coefficient with a significance of .01 or better. * indicates .05 or better

Discussion

The purpose of this study was to determine whether instructional strategies imbedded in the program design of the study context were related to the attainment of adult learners' meta-skills. Instructional strategies were represented in this study by 19 end-of-course survey questions and were defined as characteristics and techniques implemented in the instructional context to promote learning. Meta-skills were represented by 10 "Across the Curriculum" skills and were defined as cognitive and social processes that transcend knowledge acquisition and that are used to process new information in novel situations (Clark, 1999; Jacobson, 1998).

Three primary findings resulted from this study. First, clusters of end-of-course survey questions, hereafter referred to as instructional strategies, tended to function together in relation to students' reported meta-skill attainment. Four such clusters, or composite instructional strategies, were identified. Second, the curriculum composite of instructional strategies strongly correlated with reported attainment of all ten meta-skills. Third, the assessment composite of instructional strategies correlated with reported attainment of none of the meta-skills.

The first statistical test run on the data collected from the 2,567 end-of-course surveys was a Pearson correlation coefficient [r]. Analysis of the Pearson's r raised concerns of multi-colinearity. Many instructional strategies seemed to be interrelated. Multi-colinearity tends to give false positive results with statistical tests such as Pearson's r and multiple regression analysis. An analysis of the results from the Pearson's r led to a factor analysis of the whole sample.

Before the factor analysis was performed, a multiple regression analysis of the whole sample was completed. This analysis was a correlation of the 19 instructional strategies as independent variables with the ten meta-skills as dependent variables. This whole sample multiple regression analysis demonstrated that specific meta-skills (the

dependent variables) strongly correlated with specific instructional strategies (the independent variables). Four instructional strategies significantly related to the reported attainment of seven meta-skills. Three meta-skills were not significantly related to specific instructional strategies (see ***Findings***, Chart 1, p. 8).

Exploring the relationship between individual instructional strategies and reported meta-skill attainment was the initial purpose of this study. However, upon running a factor analysis on the data, it was found that these individual strategies clustered into identifiable composites. The instructional composites provided a clearer, more significant picture of the relationship between instructional strategies and reported meta-skill attainment.

Instructional Composites

The factor analysis identified four composites of instructional strategies that were related to the reported attainment of specific meta-skills in similar ways. These four composites were named according to their defining characteristics.

- Andragogy, Composite Instructional Strategy #1, clustered end-of-course survey questions 1 through 7:
    1. The instructor's professional and academic experiences were appropriate to teach this course
    2. The instructor made good use of the allotted class time
    3. The instructor was effective in helping students share their professional knowledge
    4. The instructor treated me and my colleagues as professional adults
    5. The instructor was effective in encouraging and motivating me and my colleagues
    6. The instructor taught the learning objectives set out in the curriculum materials
    7. The instructor made it clear why it was important to learn the subject matter
- Assessment, Composite Instructional Strategy #2, clustered end-of-course survey questions 8 through 10, and 18:

8. The instructor established clear criteria for grading students' performance
9. The instructor's grades accurately reflected students' performance
10. The instructor provided detailed feedback on the quality of graded assignments
18. The grading process measured what I actually learned, performed, and produced.

- Curriculum, Composite Instructional Strategy #3, clustered end-of-course survey questions 15 through 17, and 19:
  15. The module/syllabus is clearly written
  16. The outside activities/assignments helped me to understand and make use of the knowledge I gained from this course
  17. The in-class activities/assignments helped me to discuss key concepts and experiences with other adult learners
  19. I was able to understand the information in the textbook
- Faith, Composite Instructional Strategy #4, was end-of-course survey question #13:
  13. The instructor's faith was evident during the course

(For Factor Analysis results please see ***Findings***, Chart 2, p. 9)

A primary finding of this study was that clusters of instructional strategies tended to function together in relation to students' reported meta-skill attainment. Although these composite instructional strategies were identified through a factor analysis, each composite was supported by a recognized educational theory. The theoretical support for each composite hypothesized the positive relationship between specific strategies and student growth, explained how individual strategies complemented one another, and described the relationships between these instructional strategies.

Andragogy, Composite Instructional Strategy #1, was drawn from seven strategies (end-of-course survey questions 1 through 7) that are descriptors of Knowles' "theory of adult learning" (Pratt, 1993, p. 16). Among these strategies were the following:

- incorporating students' professional experiences into the learning context,
- treating students as professional adults,
- making clear the relevance of course content to student's professional lives, and
- using a variety of resources effectively.

This non-traditional program was intentionally designed to meet the needs of adult learners. This finding confirmed the positive relationship between the strategies of andragogy and students' reported attainment of meta-skills.

Assessment, Composite Instructional Strategy #2, was drawn from four strategies (end-of-course survey questions 8, 9, 10 and 18) that described, in part, current assessment theory's construct of effective assessment. Assessment strategies that provided clear criteria, that accurately reflected performance, and that were timely and comprehensive composed this composite and are included in this theoretical construct (Wiggins and McTighe, 1998). Current assessment theory also claims that assessment fosters learning (Porter, 2000). This claim was not supported by this study, for the assessment composite was found to be unrelated to students' reported attainment of meta-skills.

Curriculum, Composite Instructional Strategy #3, was drawn from four strategies (end-of-course survey questions 15, 16, 17, and 19) that clearly supported the social learning theories (Johnson & Johnson, 1994; Rotter, 1954) upon which this study and the program were based. The curriculum composite consisted of the curricular "how" (in-class and out-of-class activities and assignments) and the "what" (the course module and textbooks) of the learning environment. Social learning theory claims that interactive and interpersonal course activities and assignments, coupled with substantive content, result in student learning. This instructional composite confirmed that collaborative learning strategies and substantive content aggregated and together were positively related to students' reported attainment of meta-skills.

Faith, Composite Instructional Strategy #4, was drawn from one strategy (end-of-course survey question 13), "The instructor's Christian faith was evident." This strategy supported Jourard's Interpersonal Communication Theory (1971) which states that self-disclosure builds trust. Trust, in turn, creates a safe learning environment in which

students can explore challenging, often personal, issues. Ostermann (1990) stated that self-disclosing instructors, who make personal values public, are more likely to stimulate students to explore their values. This finding supported Jourard's theory, as instructors' self-disclosure of their faith was positively related to students' reported attainment of meta-skills 1 and 2: the ability to see things from the perspective of a Christian worldview and skill in ethical thought.

It should be mentioned that three end-of course survey questions were not significantly related to any instructional strategy:

- The instructor set high standards for achievement in this course (end-of-course question #11)
- The instructor was accessible to me beyond the regular class period (end-of-course question #12)
- On the average, our class began and ended on time (end-of-course question #14)

Given the nine hour block of instructional and relational time for each class period in this non-traditional program, it was not surprising that beginning and ending class on time and instructor accessibility were not important issues to students.

It was surprising that the level of expectations set by the instructor seemed unrelated to reported meta-skill attainment. A plethora of educational research supports the importance of setting high expectations to increase student learning. The discrepancy between this study's findings and the predominance of research literature highlights an area in need of further investigation.

The factor analysis consolidated the original 19 instructional strategies into four composite instructional strategies. A multiple regression analysis was then run to test the correlation of the four composite instructional strategies (the independent variables) with the reported attainment of each of the ten meta-skills (the dependent variables) (see ***Findings***, Chart 3, p. 9).

To validate that these correlations were independent from the courses taught and the instructors who taught them, multiple regression analyses were then run while

controlling for course and selected instructors (see ***Findings***, Charts 4 and 5, pp. 10-12). When controlling for course and instructor, the same correlations of consolidated instructional strategies with reported meta-skill attainment occurred as with the whole sample:

- Andragogy correlated moderately (.21-.27) with meta-skills 2, 3, 5, & 8
- Assessment correlated insignificantly across all meta-skills
- Curriculum correlated strongly (.27-.50) across all meta-skills
- Faith correlated moderately (.21-.24) with meta-skills 1 & 2

Curriculum Composite

A second primary finding of this study was that the curriculum composite of instructional strategies strongly correlated with reported attainment of all ten meta-skills. This curriculum composite consisted of four instructional strategies. Two strategies focused on context: survey questions #16 and #17 stated that the in-class and out-of-class activities and assignments fostered learning and application of class content. Two strategies focused on content: survey questions # 15 and #19 stated that the module was clear and the textbook was understandable.

Clear and understandable content, taught in a student-centered, collaborative context, resulted in the strongest correlations with reported meta-skill attainment of the four composite instructional strategies. The educational design of this program was based on a student-centered, cognitive model of instruction. That is, the goal of the teaching/learning process was the intellectual and professional maturation of the student. Content and instructional strategies were chosen to foster the cognitive development of the student, who was viewed as a self-reliant, self-directing individual.

Teaching and learning always occur in some context. The context of this study was based on social learning theory and designed to be student-centered and collaborative. A large body of research confirmed the findings of this study that a student-centered, collaborative context supports meta-skill attainment.

Johnson, Johnson, and Smith (1994) found that greatest cognitive growth occurred when students worked collaboratively and were rewarded as a group for

academic performance. Ahern-Rindell (1998), in a recent case study, concluded that the use of cooperative work groups and inquiry-based activities contributed importantly to students' meta-skill development. Smith (1994) found that active participation and peer-to-peer interaction consistently emerged as being significant and positively related to students' meta-skill growth, especially critical thinking.

In focus group interviews, students reported that small group work and application of course content to their work environment facilitated their growth in meta-skills. One student commented, "Trusting my cohort group, working together toward a common goal, completing my course assignments in my workplace - these are the things that made me grow. Especially my ability to work in a team, and in problem solving and critical thinking skills." Another student remarked, "Being held accountable by a group whose respect I wanted, studying and completing assignments together, working with my instructors and my supervisors - all these forced me to learn how to solve problems, how to communicate, how to find materials I needed, how to apply my knowledge in my fourth grade classroom."

Wilson (1993) advocated for locating learning within the actual situation of its creation and use. In this educational environment, learning was placed in its natural context. Activities and assignments were focused upon students' professional experience and environment. This study's findings supported the conclusion that this curricular context facilitated students' integration of knowledge and cultivation of all ten meta-skills.

The curriculum composite also consisted of instructional strategies that focused on clear and understandable content. In conjunction with the student-centered, collaborative context, this content resulted in the strong correlations with reported meta-skill attainment. Because the goal of this educational program was the intellectual and professional maturation of the student, content was chosen to foster students' cognitive development.

Several studies supported the contention that "a robust content," coupled with interactive instructional strategies, result in meta-skill attainment (Palincsar, 1989). Pintrich and Garcia (1994) concluded that meta-skill attainment was a cyclical process in

which meta-skill development influenced goal orientation, which in turn affected cognitive engagement with content, which resulted in increased performance levels, which led to further meta-skill development. Garner (1990) concluded that effective meta-skill development resulted from learning vigorous content and implementing a variety of cognitive strategies. Billson and Tiberius (1994) found evidence that effective teaching and learning was dependent upon the breadth and depth of content, in conjunction with active inquiry in a supportive atmosphere. Dressel and Marcus (1994) concluded that content chosen to be interesting, stimulating, and productive, when combined with teaching methods that encourage students' engagement, fostered high levels of meta-skill development.

In this study's educational context, content was selected for its currency, its applicability and relevancy to the student's workplace, and for its contribution for the student's knowledge base. When combined with active and interactive instructional strategies, students reported this program's content was positively related to their meta-skill attainment across all ten meta-skills. In a focus group interview, one student commented, "The content was challenging. It stretched me, but not to the breaking point. It forced me to think, to process, to reflect on what I was doing." Another student stated, "The textbooks were dry the first read-through. But then, when we discussed and applied the information, it came alive. The application of course content - that was what did it for me. I could use the material then."

Students reported attainment of all ten meta-skills as a result of the curriculum composite of instructional strategies. This finding substantiated the large body of educational research that has concluded that a strong content and an interactive context result in student growth. The relationship between the curriculum composite and reported meta-skill attainment was clearly the strongest relationship found in this study.

Assessment Composite

A third primary finding of this study was that the assessment composite of instructional strategies correlated with attainment of none of the meta-skills. The assessment composite consisted of four instructional strategies: clear grading criteria, timely and adequate feedback, and accurate reflection of performance. Through factor

analysis it was found that these four instructional strategies tended to function together in relation to students' reported meta-skill attainment. Through the multiple regression analysis it was found that there were no statistically significant correlations between the assessment composite and students' reported meta-skill attainment.

Wiggins and McTighe (1998) have stated the effectiveness of assessment is ultimately determined by its achievement of desired learnings. Danielson claims it is through assessment that students advance their understandings (1996). In this study, assessment was unrelated to meta-skill attainment. Therefore, according to current assessment theory, students in this program were potentially inhibited from achieving desired learnings and advancing their understandings.

In focus group interviews, several student comments were directed to this assessment issue. One student observed, "This program is schizophrenic. On the one hand, we apply, apply, apply our new knowledge to our workplaces. On the other hand, we are tested, tested, tested on what we learn. The application should be the test! We should be asked - Can you apply your new knowledge successfully? Prove it!" Another student commented, "We're adult learners. Why are we being given midterms and final exams? Why are we writing long research papers? Our weekly assignments are based in our elementary classrooms. Our class presentations are transferable to our work. So tell me - why the tests? Why the papers?" Judging from interview responses, assessment practices were resented and seen as obstructions to learning.

The most current thinking among educators is that assessment reform is needed across educational contexts (Bond, 2000). Bond, Herman and Arter (1994) have stated that we must change our assessment strategies to tie assessment design and content to new outcomes and purposes for assessment. A new purpose for assessment is to foster learning of worthwhile academic content, while providing educators with evidence for making decisions about curriculum and teaching (Porter, 2000). The new assessment design and content has been identified as authentic and performance-based, and is regarded as more reflective of new curricular goals and methods of instruction (Geltner, 1993; National Commission on Teaching and America's Future, 1996).

In this study context, assessment practices were primarily traditional and consisted of exams, research papers, article critiques, and presentations. Program

designers have been incorporating more authentic, performance-based assessments into the program's courses as a response to student input and current assessment theory. Clearly, the evidence from this student sample supported this move from traditional assessment practices to assessments demonstrating application of course content.

Students reported no attainment of meta-skills as a result of the assessment composite of instructional strategies. The relationship between this assessment composite and reported meta-skill attainment was the weakest relationship found in this study. This evidence can be viewed as dis-confirming of current assessment theory, which states that assessment leads to learning. It can more reasonably be viewed as confirming current assessment theory and highlighting a need for more authentic, performance-based assessment practices in the program under study.

Implications for Practice

Three key implications were drawn from this study: the value of a strong curriculum, the importance of appropriate assessment procedures, and the merit of intentionally developing learners' meta-skills.

The importance of a strong curriculum, both in context and content, was highlighted in this study. It was found that substantive curriculum was strongly related to students' reported attainment of meta-skills across all categories. This finding implied that resources spent on curriculum development were a worthwhile investment for this educational institution, whose goal was to facilitate student growth.

The strong relationship found between curriculum and student learning also implied that Johnson and Johnson's Social Interdependence Theory was applicable to the adult learning context. This social learning theory has been studied in elementary and secondary as well as traditional higher education settings. Little or no research has been conducted testing this theory in an adult education context. This study's findings support the use of Johnson and Johnson's Social Interdependence Theory in a non-traditional, higher education setting.

The importance of appropriate assessment procedures was also highlighted in this study. It was found that assessment practices were unrelated to students' reported meta-

skill attainment. Clearly, assessment practices in this study's context must be redesigned to support student learning and contribute to the development of meta-skills.

The success of teaching should be determined by whether students learn, not by what the instructor does. Assessment strategies must provide evaluation opportunities that offer a picture of what has been learned, while supporting the learning process. For the adult student, assessment must be problem-centered and application-based to facilitate the development of meta-skills.

The importance of intentionally developing learners' meta-skills was another implication of this study. As knowledge bases expand, meta-skills such as critical thinking, problem solving, and decision-making become critical for the intellectual and professional survival of adult learners. Pintrich and Garcia (1994) concluded that meta-skill development led to increased cognitive engagement and learning, which in turn led to meta-skill development. If learning is rooted in meta-skill development, then overtly training students in the use of meta-skills should enhance the learning process.

Tishman, Perkins and Jay (1995) described a model for teaching students meta-skills. They stated that these skills, when taught intentionally, "became habits which led to a future of effective problem solving, thoughtful decision making, and life-long learning" (p. 1). Surely students' attainment and reinforcement of these habits are the goal of every adult educator.

Implications drawn from this study were the following:

- Curriculum and assessment are essential components of any educational program and require substantial resource investment and attention to design.
- Direct meta-skill instruction should be a component of courses offered in formal adult education programs.

Recommendations for Further Research

In some respects, the current study raised more questions than it answered. Therefore, these research recommendations were focused narrowly on suggestions for studies of the relationship between instructional strategies, instructor characteristics, and student learning. A cautious approach to study design should contribute to a more

scholarly understanding of this relationship and researchers must keep in mind that they will find no simple formula for good teaching.

The following relationships and concepts deserve further study:

- What was the relationship between curriculum strategies of context and content?
  - What was the relative influence of each?
  - How did they impact each other?
  - Were they equally effective as separate strategies, or was the combination synergistic?
  - What influence did individual courses have upon the effectiveness of the curriculum for enhancing learning?

- What was the relationship among assessment strategies?
  - Was the effectiveness of certain strategies canceled by the ineffectiveness of others?
  - What influence did individual instructors have upon the effectiveness of assessment strategies to enhance learning?
  - In what ways did individual course goals and assignments influence the relationship between assessment strategies and learning?

- In this context, what was the relationship between the instructional strategy of setting high standards and meta-skill development?
  - What was the relationship between individual instructors' expectations and student learning?
  - What was the relationship between individual course goals and assignments, instructor's expectations, and student learning?
  - In what ways did cohort demographics (geographic location, gender distribution, age, cohort size) influence expectations and student learning?

- What was the relationship between individual faculty member's strategies and goals and student learning?
  - In what ways did individual instructors implement the general strategies imbedded in the program's design?
  - How did instructional variations influence student learning?
  - How did differing goals influence student learning?

- What characteristics of the curricula were related to meta-skill attainment?
  - Did the program's courses tend to work together to enhance student learning?
  - Did conflicts among course goals, processes and outcomes reduce student learning?
  - What course characteristics were more strongly related to student learning?

Conclusion

Brookfield (2000) has stated that the research agenda in the field of adult education should focus on ways in which meta-skills, and in particular critical reflection, are learned and taught across adult educational contexts. This study focused on the relationship between instructional strategies and students' reported meta-skill attainment in an adult education context.

The three key findings of this study were the following:

- Instructional strategies clustered into four identifiable composites, each of which was supported by a current and credible educational theory;
- The curriculum composite of instructional strategies strongly correlated with reported attainment of all ten meta-skills;
- The assessment composite of instructional strategies correlated with reported attainment of no meta-skills.

It is hoped the findings of this study will encourage reflectiveness about teaching and learning among faculty and students in and beyond this study context. As educators of adults, we must be asking - what can research tell us about program designs offered to adult learners? How can we best equip our students to compete in today's world?

We live in an age of information. The knowledge base of many professions is growing exponentially. The glut of information overwhelms us and forces us to ask - What do our adult students really need to know and do?

An important goal of responsible adult education in the 21st century must be the development of learners' meta-skills - those skills required for productivity in professional jobs of the Information Age. Employers from every profession are asking educational institutions to equip a workforce with the necessary skills to think critically, to solve problems, to communicate effectively and to work productively in teams.

Employers are requesting that learners be trained in cognitive and social processes that transcend knowledge acquisition. They are expecting, even insisting, that educators guide learners in their attainment of meta-skills. Intentionally developing educational institutions and instructional strategies that facilitate meta-skill growth can importantly impact our learners' success in the new century.

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APPENDIX A

End of Course Survey

Instructions: Answer each question as precisely as you can. Circle only one response for each question. If the question does not apply to you leave it blank. Give the Survey to the Class Representative who will forward them collectively to the Research Specialist.

Core Group _____ Course # _____ Instructor _____

Beginning Date _____ Ending Date _____

For proper processing please fill in all above information.	**not at all**	**very little**	**some-what**	**mostly**	**com-pletely**
Instructor					
1. The instructor's professional and academic experiences were appropriate to teach and facilitate this course.	1	2	3	4	5
2. The instructor made good use of the allotted class time.	1	2	3	4	5
3. The instructor was effective in helping me share my professional knowledge.	1	2	3	4	5
4. The instructor treated me and my colleagues as professional adults.	1	2	3	4	5
5. The instructor was effective in encouraging and motivating me and my colleagues.	1	2	3	4	5
6. The instructor made effective use of the textbooks and the module.	1	2	3	4	5
7. The instructor made it clear how the subject matter could enhance my professional growth.	1	2	3	4	5
8. The instructor established clear criteria for grading my assignments. (Assignments include in-class and out-of-class work that is graded.)	1	2	3	4	5
9. The instructor's assessment of my assignments, to date, accurately reflect my performance.	1	2	3	4	5
10. The instructor provided timely, adequate feedback on the quality of graded assignments.	1	2	3	4	5
11. The instructor set high standards for achievement in this course.	1	2	3	4	5
12. The instructor was accessible to me beyond the regular class period.	1	2	3	4	5
13. The instructor's Christian faith was evident.	1	2	3	4	5
14. On the average, our class began and ended on time.	1	2	3	4	5
Curriculum					
1. The module/syllabus was written clearly.	1	2	3	4	5
2. The outside activities/assignments helped me to understand and make use of the knowledge I gained from this course.	1	2	3	4	5
3. The in class activities/assignments helped me to discuss key concepts and experiences with other adult learners.	1	2	3	4	5
4. The grading procedures measured what I actually learned, performed, and produced.	1	2	3	4	5
5. I was able to understand the information in the textbook.	1	2	3	4	5

(over)

	not at all	very little	some-what	mostly	com-pletely
Ten Across Objectives **Rate the effectiveness of this course in helping me attain:**					
1. The ability to see things from the perspective of a Christian world view.	1	2	3	4	5
2. Skill in ethical thought and action.	1	2	3	4	5
3. Values and skills necessary for lifelong learning.	1	2	3	4	5
4. The ability to read complex materials with comprehension.	1	2	3	4	5
5. Skill in thinking critically concerning ideas and performance (i.e. reflective practice).	1	2	3	4	5
6. Skill in problem solving and decision making.	1	2	3	4	5
7. The ability to communicate effectively through writing.	1	2	3	4	5
8. The ability to communicate effectively orally.	1	2	3	4	5
9. The ability to find needed information (sometimes called information literacy).	1	2	3	4	5
10. The ability to work effectively in teams.	1	2	3	4	5

Comments: **(please print legibly)**

APPENDIX B

Ten Across the Curriculum: Key Process Skills

Supporting the Teacher As Agent of Change conceptual model for the Master of Education Degree, and undergirding the learning experience for practicing classroom teachers are the "Ten Across the Curriculum" learning process skills. Candidates in the M.Ed. program will practice these skills throughout their graduate learning experience. The "Ten Across" skills are:

1. **The ability to see things from the perspective of a Christian worldview.**
2. **The ability to consistently exhibit ethical thought and action.**
3. **The ability to abide by values necessary for lifelong learning.**
4. **The ability to read complex materials with comprehension.**
5. **The ability to think critically concerning ideas and performance (i.e. reflective practice).**
6. **The ability to engage in problem solving and effective decision-making.**
7. **The ability to communicate effectively through writing.**
8. **The ability to communicate effectively in team meetings and presentations.**
9. **The ability to find needed information (sometimes called information literacy).**
10. **The ability to work effectively in teams.**

The Ten Across Skills are practiced and perfected in every M.Ed. course. These skills are included as part of the End of Course Survey data collected at the close of each core course.